



## A classification of joint maintenance and inventory optimization models

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When financial resources are scarce, the pressure to reduce working capital increases. Companies can prevent themselves of going bankrupt, even when making serious losses, as long as they can pay their current liabilities. The management of cash, inventory and debt can save the company. As inventory in some industries has a big influence on working capital, the reduction of the inventory might make the difference between surviving and failing. On the one hand, maintenance models often rely on the assumption of an inexhaustible number of available spare parts (e.g. Barlow & Hunter, 1960). On the other hand, focusing on the inventory policy might resolve in higher costs for maintenance (Acharya et al. 1986). The joint optimization of spare parts and maintenance takes into account the trade-off between maintenance and inventory policies. This joint optimization was found very beneficial, among others, by Ilgin & Tunali (2007). They were able to reduce total annual maintenance costs by 53 % for their case study. Several papers are published concerning the joint optimization of maintenance and inventory, but no survey is provided thus far. This classification paper will give an overview of the relevant literature on joint optimization of maintenance and inventory. As several types of inventories influence the downtime of a system (work-in-progress, repairable spare parts, non repairable spare parts, etc.), a first subdivision of the problems is made based on these types of inventory. A further subdivision is made on the maintenance and inventory policies used. The two major groups of maintenance policies are preventive and condition based maintenance. As well papers describing continuous review as periodic review are included in the review paper. The result is a literature review that will be part of a doctoral research. The goal of this research is to include a third component into the framework. As service companies also have to travel to their customers to repair the broken machines, scheduling and routing will be added to the models. This review functions as a starting point of research on the mobile repairman problem, a special case of after sales service management.

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